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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/609,062	06/27/2003	Sridharan Venk	K35A1309	6852

35219 7590 08/24/2005

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EXAMINER	
CHEN, TIANJIE	

ART UNIT	PAPER NUMBER
2652	

DATE MAILED: 08/24/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/609,062	VENK, SRIDHARAN	
	Examiner	Art Unit	
	Tianjie Chen	2652	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *29 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-21* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-21* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Final Rejection

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

1. Claims 1-21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Applicant Admitted prior Art (AAPA) in view of Jiang (US 6,455,354) and Moden (US 5,733,800).

Claims 1, 8, and 15; AAPA shows a flex circuit assembly, in [002] to [007] in Specification, for use in a head stack assembly for used in a disk drive including: a disk drive base; and a head stack assembly rotatably coupled to the disk drive base, the head stack assembly including: a rotary actuator; and a flex circuit assembly attached to the rotary actuator; the flex circuit assembly including: a flex circuit base film; an integrated circuit device disposed adjacent the flex circuit base film and including a solder bump connection; an electrically conductive trace disposed upon the flex circuit base film, the trace including a contact pad, the contact pad electrically connected to the solder bump connection; an underfill portion disposed between the flex circuit base film and the integrated circuit device for attaching the integrated circuit device to the flex circuit base film, the underfill portion being formed of an underfill material; and a glob top portion (cover portion) disposed upon the underfill portion and the flex circuit base film for sealing the electrically conductive trace.

AAPA does not specify the material for the glob top portion and the underfill portion.

Jiang teaches that the glob top is usually made of a material of epoxy or silicone (Column 1, lines 24-24). Moden teaches an underfill made of a material of acrylic resin (Column 9, lines 12-13).

It would have been obvious at the time the invention was made to one of ordinary skill in the art to use epoxy as the glob top and acrylic resin as the underfill. The rationale is as follows: Jiang teaches that epoxy is usually used for the glob top, and Moden teaches that such chosen underfill has better thermal, mechanical and viscous properties (Column 9, lines 12-28). One of ordinary skill would have been motivated to use these materials thus make up the device and obtaining better thermal, mechanical and viscous properties. In thus constructed device the glob top material being different than the underfill material.

Claims 2, 9, and 16; in the above constructed device, the underfill material is a no-flow encapsulant after cured.

Claims 3, 10, and 17; in the above constructed device, the underfill material is a capillary flow encapsulant (Column 9, lines 5-11).

Claims 4. 11, and 18; AAPA shows a flex circuit cover film disposed upon the flex circuit base film, the flex circuit cover film includes an opening, the integrated circuit device and the electrically conductive trace are disposed within the opening.

Claims 5, 12, and 19; AAPA shows that the underfill portion and next applied material for covering are both disposed in the opening ([007]). In the above, constructed device, the next applied material is the glob top material.

Claims 6, 13, and 20; it is well known in the art that a wide range of materials have been used for the integrated circuit, the flex circuit base and underfill. No unexpected result has been disclosed in this application for set the relationship of coefficients of thermal expansion in such a way. One of ordinary skill in the art would have been choosing the materials through experimentation and optimization, which may include a set: underfill portion use acrylic having has a coefficient of thermal expansion of 3.8 X in/in/°F X 10^{-5}, which is between the thermal expansion between coefficients of thermal expansion of the integrated circuit device, which uses a commonly used glass reinforced Nylon having a coefficient of thermal expansion of 1.3 X in/in/°F X 10^{-5}, and the flex circuit base film made of Polyester having a coefficient of thermal expansion of 6.9 X in/in/°F X 10^{-5}.

Claims 7, 14, and 21; in above constructed device, underfill portion (acrylic) inherits a coefficient of thermal expansion of 3.8 X in/in/°F X 10^{-5},which is greater than inherited coefficient of thermal expansion of 3.0 X in/in/°F X 10^{-5} of the glob top portion (epoxy).

Response to Arguments

2. Applicant's arguments filed 07/29/2005 have been fully considered but they are not persuasive.

- With regard to reference of Jiang: (1) Glob top portion is made after the electrical connection has been done. The material for the glob top has nothing to do the way of making the electric connection. (2) AAPA shows a solder bumps, which correspond to the pad 138 in Figs. 3 and 5, which is a bump for soldering (welding, column 1, line 57). (3) Glob top is just used for solving the problem wire sweep and detachment. Therefore, the combination is proper.

- With regard to reference of Moden: the material is supposed to be used for various chips. No reason has been seen that the Moden's material cannot be used in AAPA's device.
- Rejection maintains.

Conclusion

3. The prior art made of record in PTO-892 Form and not relied upon is considered pertinent to applicant's disclosure.

Web search report indicates: glass reinforced Nylon having a coefficient of thermal expansion of 1.3 X in/in/°F X 10^{-5}, Polyester having a coefficient of thermal expansion of 6.9 X in/in/°F X 10^{-5}, acrylic has a coefficient of thermal expansion of 3.8 X in/in/°F X 10^{-5}, and epoxy has a coefficient of thermal expansion of 3.0 X in/in/°F X 10^{-5}.

4. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tianjie Chen whose telephone number is 571-272-7570. The examiner can normally be reached on 8:00 – 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Hoa Nguyen can be reached on 571-272-7579. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TIANJIE CHEN
PRIMARY EXAMINER